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The EM Glossary: a community effort towards a harmonised terminology in electron microscopy

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For data to be fully exploitable and re-usable in different contexts it needs to be annotated with rich metadata that uses commonly understood vocabularies and semantics [1]. Using terminology that is standardized and agreed upon within a community ensures unambiguous understanding of metadata.

In the field of EM, a number of application-level initiatives independently started developing metadata schemas [e.g. 2,3], to describe experimental equipment, workflows, and analysis procedures. Domain-level semantic harmonisation of such efforts is required to ensure data interoperability down the line. As a first step, misalignment of terminology has to be addressed by mapping concepts of different scientific contexts, and user groups.

The Helmholtz Metadata Collaboration (HMC) [4] is currently coordinating an effort, the EM glossary group [5], to establish a documented terminology for electron and ion microscopy (IM). This community involves scientists from more than 23 institutions across Switzerland, Austria, and Germany and representatives of the FAIRmat and the MatWerk NFDI consortia.

In a remote collaborative workflow and bi-weekly online meetings, we work towards formulating consensus on terms that are commonly used in the EM and IM communities. Here we produce concise, unpacked definitions with rich annotations in accordance with semantic best practices. By now, we provide harmonized definitions for more than 60 terms which can be explored via a web interface [6].

For implementation and machine readability the glossary is further implemented as an OWL ontology [7]. For this we use a fully automated workflow in separate, but coupled gitlab repository which translates novel terms from a community repository into OWL. Then releases are triggered depending on the progress of terminology extension by the community. Both these representations are intended as a central resource to map and align application-level semantics, thereby acting as semantic glue within the field.

Interested to get involved? See [5] and send an email to hmc@fz-juelich.de to get in touch!

Acknowledgements

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References:

[1] Wilkinson, M.D. et al. Scientific Data. https://dx.doi.org/10.1038/sdata.2016.18

Könnecke, M, et al. Journal of applied crystallography https://doi.org/10.1107/S1600576714027575[3] Joseph,
R, et al doi.org/10.5445/IR/1000141604[4] Helmholtz Metadata Collaboration: https://helmholtz-metadaten.de/en[5]
EM Glossary Group https://codebase.helmholtz.cloud/em_glossary/em_glossary (development repository)[6]
EM Glossary User Interface: https://emglossary.helmholtz-metadaten.de/ (temporary demonstrator)[7] EM
Glossary OWL: https://owl.emglossary.helmholtz-metadaten.de/

Please specify "other"

In addition, please add 3 to 5 keywords.

Metadata Harmonization, Ontology development, Community Project,

Please specify "other"

For whom will your contribution be of most interest?

Researchers

Please assign yourself (presenting author) to one of the following groups.

Data professionals who provide and maintain data infrastructure

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